

**WHAT IS CLAIMED IS:**

1. A method for treating inflammatory bowel disease in a patient comprising administering to said patient a sustained release pharmaceutical composition comprising a pharmaceutically effective amount of an anti-malarial compound in association with a pharmaceutically acceptable excipient which delays and targets the release of said anti-malarial compound in the gastrointestinal tract of the patient.

2. The method according to Claim 1 wherein the inflammatory bowel disease is Crohn's disease.

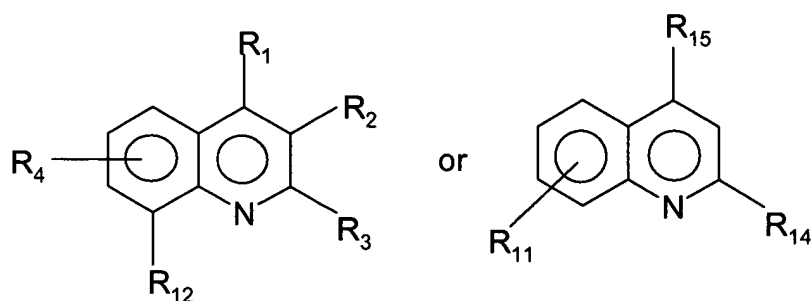
3. The method according to Claim 1 wherein the inflammatory bowel disease is ulcerative colitis.

4. The method according to Claim 1 wherein the inflammatory bowel disease is indeterminate colitis.

5. The method according to Claim 1 wherein the inflammatory bowel disease is infectious colitis.

6. The method according to Claim 1 wherein the anti-malarial compound is aminoquinoline or hydroxyquinoline.

7. The method according to Claim 6 wherein said aminoquinoline has the formula:



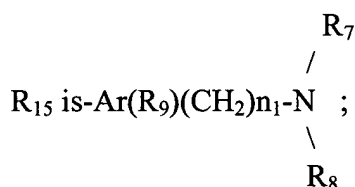
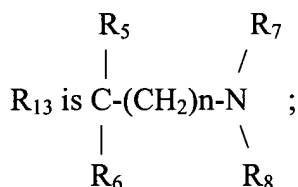
or pharmaceutically acceptable salts thereof,

wherein

R<sub>2</sub> and R<sub>3</sub> are independently hydrogen, or lower alkyl or R<sub>2</sub> and R<sub>3</sub> taken together with the carbon atoms to which they are attached form an aryl ring, which aryl

ring is unsubstituted or substituted with an electron withdrawing group or an electron donating group,

one of  $R_1$  and  $R_{12}$  is  $NHR_{13}$  while the other is hydrogen;



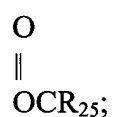
$R_4$ ,  $R_{10}$ ,  $R_{11}$  and  $R_{14}$  are independently hydrogen or an electron donating group or electron withdrawing group;

$R_5$  and  $R_6$ , are independently hydrogen or lower alkyl which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

$R_7$  and  $R_8$  are independently hydrogen or lower alkyl, which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

Ar is aryl having 6-18 ring carbon atoms which may be unsubstituted or substituted with an electron donating or electron withdrawing group;

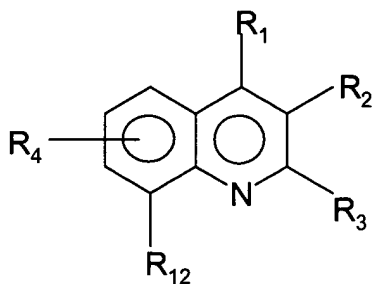
$R_9$  is hydrogen or hydroxy or lower alkoxy or



$R_{25}$  is lower alkyl or hydrogen; and

$n$  and  $n_1$  are independently 1-6.

8. The method according to Claim 7 wherein the aminoquinoline is of the formula:



9. The method according to Claim 8 wherein R<sub>1</sub> is NHR<sub>13</sub> and R<sub>12</sub> is hydrogen.
10. The method according to Claim 9 wherein R<sub>5</sub> is hydrogen and R<sub>6</sub> is lower alkyl.
11. The method according to Claim 9 wherein R<sub>5</sub> is hydrogen and R<sub>6</sub> is methyl.
12. The method according to Claim 9 wherein n is 3.
13. The method according to Claim 9 wherein R<sub>3</sub> is hydrogen.
14. The method according to Claim 9 wherein R<sub>4</sub> is substituted in the 7-position of the quinoline ring.
15. The method according to Claim 11 wherein R<sub>4</sub> is 7-halo.
16. The method according to Claim 15 wherein halo is chloro.
17. The method according to Claim 9 wherein R<sub>7</sub> is ethyl and R<sub>8</sub> is ethyl or 2-hydroxy ethyl.
18. The method according to Claim 8 wherein R<sub>12</sub> is NHR<sub>13</sub> and R<sub>1</sub> is hydrogen.
19. The method according to Claim 18 wherein R<sub>5</sub> is hydrogen and R<sub>6</sub> is lower alkyl.
20. The method according to Claim 19 wherein R<sub>5</sub> is hydrogen and R<sub>6</sub> is methyl.
21. The method according to Claim 18 wherein n is 3.
22. The method according to Claim 19 wherein R<sub>7</sub> is hydrogen, methyl or ethyl and R<sub>8</sub> is hydrogen, methyl, ethyl, propyl

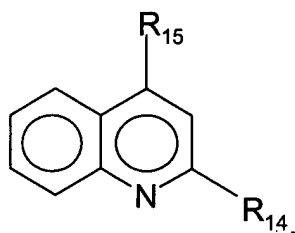
or isopropyl.

23. The method according to Claim 18 wherein  $R_4$  is substituted on the 6-position of the quinoline ring.

24. The method according to Claim 23 wherein  $R_4$  is 6-lower alkoxy.

25. The method according to Claim 24 wherein  $R_4$  is 6-methoxy.

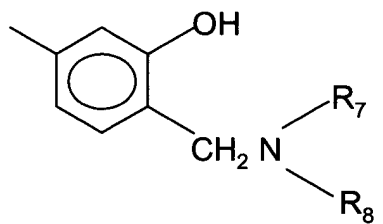
26. The method according to Claim 7 wherein the amino quinoline has the formula:



27. The method according to Claim 26 wherein Ar is phenyl.

28. The method according to Claim 26 wherein  $R_9$  is hydroxy.

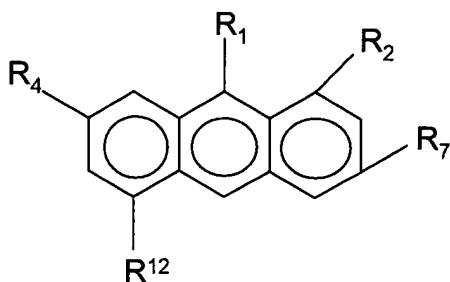
29. The method according to Claim 26 wherein  $R_{15}$  is



30. The method according to Claim 26 wherein  $R_7$  and  $R_8$  are independently lower alkyl.

31. The method according to Claim 30 wherein  $R_7$  and  $R_8$  are both ethyl

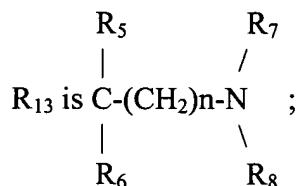
32. The method according to Claim 1 wherein the anti-malarial compound has the formula:



wherein

$R_2$  is hydrogen or lower alkyl;

one of  $R_1$  and  $R_{12}$  is  $NHR_{13}$  while the other is hydrogen;



$R_4$  is hydrogen or an electron donating group or electron withdrawing group;

$R_5$  and  $R_6$ , are independently hydrogen or lower alkyl which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

$R_7$  and  $R_8$  are independently hydrogen or lower alkyl, which may be unsubstituted or substituted with an electron withdrawing or electron donating group; and

$n$  is independently 1-6.

33. The method according to Claim 1 wherein the anti-malarial agent is pomaquine, primaquine, pentaquinine, isopentaquine, quinacrine salt, chloroquine, hydroxychloroquine, sontoquine, amodiaquine, mefloquine, or mepacrine or pharmaceutically acceptable salts thereof.

34. The method according to Claim 1 wherein the anti-malarial compound is hydroxychloroquine, chloroquine, mepacrine, mefloquine, or

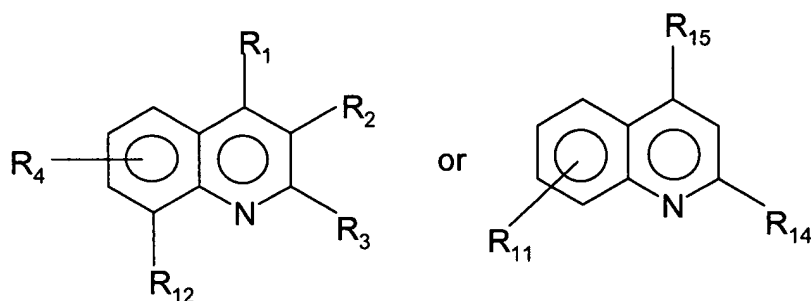
pharmaceutically acceptable salts thereof.

35. The method according to Claim 1 wherein the anti-malarial compound is hydroxychloroquine or a pharmaceutically acceptable salt thereof.

36. A pharmaceutical composition comprising a pharmaceutically effective amount of an anti-malarial compound in association with a pharmaceutically acceptable excipient which delays and targets the release of said anti-malarial compound in the gastrointestinal tract.

37. The pharmaceutical composition according to Claim 36 wherein the anti-malarial compound is aminoquinoline or hydroxyquinoline.

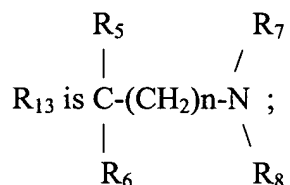
38. The pharmaceutical composition according to Claim 37 wherein said aminoquinoline has the formula:

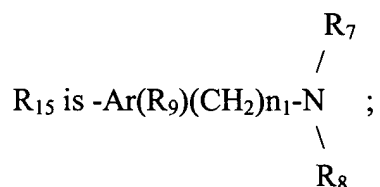


or pharmaceutically acceptable salts thereof,  
wherein

R<sub>2</sub> and R<sub>3</sub> are independently hydrogen, or lower alkyl or R<sub>2</sub> and R<sub>3</sub> taken together with the carbon atoms to which they are attached form an aryl ring, which aryl ring is unsubstituted or substituted with an electron withdrawing group or an electron donating group,

one of R<sub>1</sub> and R<sub>12</sub> is NHR<sub>13</sub> while the other is hydrogen;





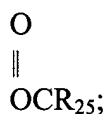
$R_4$ ,  $R_{10}$ ,  $R_{11}$  and  $R_{14}$  are independently hydrogen or an electron donating group or electron withdrawing group;

$R_5$  and  $R_6$ , are independently hydrogen or lower alkyl which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

$R_7$  and  $R_8$  are independently hydrogen or lower alkyl, which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

Ar is aryl having 6-18 ring carbon atoms which may be unsubstituted or substituted with an electron donating or electron withdrawing group;

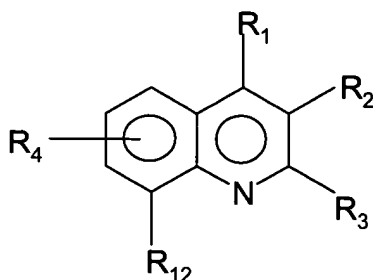
$R_9$  is hydrogen or hydroxy or lower alkoxy or



$R_{25}$  is lower alkyl or hydrogen; and

$n$  and  $n_1$  are independently 1-6.

39. The pharmaceutical composition according to Claim 38 wherein the aminoquinoline is of the formula:



40. The method according to Claim 39 wherein  $R_1$  is  $\text{NHR}_{13}$  and  $R_{12}$  is

hydrogen.

41. The method according to Claim 40 wherein  $R_5$  is hydrogen and  $R_6$  is lower alkyl.

42. The method according to Claim 40 wherein  $R_5$  is hydrogen and  $R_6$  is methyl.

43. The method according to Claim 40 wherein  $n$  is 3.

44. The method according to Claim 40 wherein  $R_3$  is hydrogen.

45. The method according to Claim 40 wherein  $R_4$  is substituted in the 7-position of the quinoline ring.

46. The method according to Claim 40 wherein  $R_4$  is 7-halo.

47. The pharmaceutical composition according to Claim 46 wherein halo is chloro.

48. The pharmaceutical composition according to Claim 40 wherein  $R_7$  is ethyl and  $R_8$  is ethyl or 2-hydroxy ethyl.

49. The pharmaceutical composition according to Claim 39 wherein  $R_{12}$  is  $NHR_{13}$  and  $R_1$  is hydrogen.

50. The pharmaceutical composition according to Claim 49 wherein  $R_5$  is hydrogen and  $R_6$  is lower alkyl.

51. The pharmaceutical composition according to Claim 50 wherein  $R_5$  is hydrogen and  $R_6$  is methyl.

52. The pharmaceutical composition according to Claim 49 wherein  $n$  is 3.

53. The pharmaceutical composition according to Claim 50 wherein  $R_7$  is hydrogen, methyl or ethyl and  $R_8$  is hydrogen, methyl, ethyl, propyl or isopropyl.

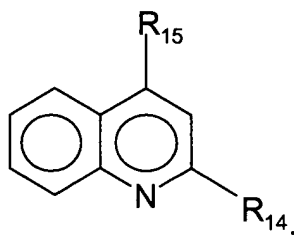
54. The pharmaceutical composition according to Claim 49 wherein  $R_4$  is substituted on the 6-position of the quinoline ring.

55. The pharmaceutical composition according to Claim 54 wherein  $R_4$  is 6-lower alkoxy.



56. The pharmaceutical composition according to Claim 55 wherein  $R_4$  is 6-methoxy.

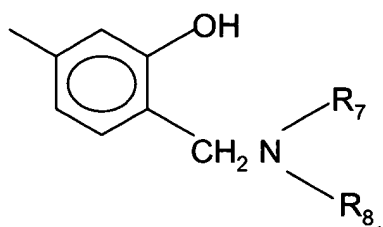
57. The pharmaceutical composition according to Claim 38 wherein the amino quinoline has the formula:



58. The pharmaceutical composition according to Claim 57 wherein Ar is phenyl.

59. The pharmaceutical composition according to Claim 57 wherein  $R_9$  is hydroxy.

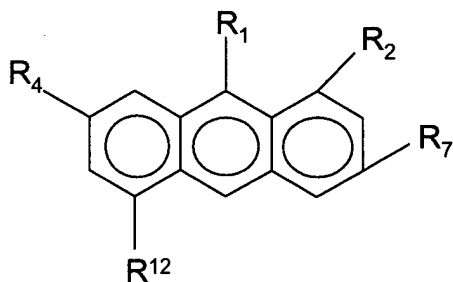
60. The pharmaceutical composition according to Claim 57 wherein  $R_{15}$  is



61. The pharmaceutical composition according to Claim 57 wherein  $R_7$  and  $R_8$  are independently lower alkyl.

62. The pharmaceutical composition according to Claim 61 wherein  $R_7$  and  $R_8$  are both ethyl

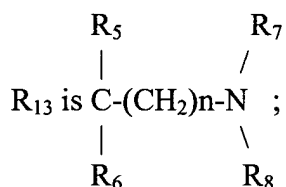
63. The pharmaceutical composition according to Claim 36 wherein the anti-malarial compound has the formula:



wherein

$R_2$  is hydrogen or lower alkyl;

one of  $R_1$  and  $R_{12}$  is  $NHR_{13}$  while the other is hydrogen;



$R_4$  is hydrogen or an electron donating group or electron withdrawing group;

$R_5$  and  $R_6$ , are independently hydrogen or lower alkyl which may be unsubstituted or substituted with an electron withdrawing or electron donating group;

$R_7$  and  $R_8$  are independently hydrogen or lower alkyl, which may be unsubstituted or substituted with an electron withdrawing or electron donating group; and

$n$  is independently 1-6.

64. The pharmaceutical composition according to Claim 36 wherein the anti-malarial agent is pomaquine, primaquine, pentaquinine, isopentaquine, quinacrine salt, chloroquine, hydroxychloroquine, sontoquine, amodiaquine, mefloquine, or mepacrine or pharmaceutically acceptable salts thereof.

65. The pharmaceutical composition according to Claim 36 wherein the anti-malarial compound is hydroxychloroquine, chloroquine, mepacrine, mefloquine, or pharmaceutically acceptable salts thereof.

66. The pharmaceutical composition according to Claim 36 wherein the anti-malarial compound is hydroxychloroquine or a pharmaceutically acceptable salt thereof.

67. The method according to Claim 1 wherein the inflammatory bowel disease is eosinophilic gastroenteritis.

68. The method according to Claim 2 wherein the Crohn's disease is characterized by eosinophila and selected from the group consisting of esophagitis, ileocolitis, jejunoileitis, colitis, perianal disease, proctosigmoiditis, and gastroduodenal Crohn's disease.

69. The method according to Claim 3 wherein the ulcerative colitis is characterized by eosinophila and selected from the group consisting of ileitis, proctosigmoiditis, and proctitis.

70. A method of preventing or treating an inflammatory bowel disease characterized by eosinophilia comprising:

measuring an eosinophil count of a patient in determining the need for treatment of a disease characterized by eosinophila and selected from the group consisting of eosinophila caused by ulcerative colitis, eosinophilic gastroenteritis, Crohn's disease, esophagitis, ileitis, proctosigmoiditis, and proctitis; and

administering a pharmaceutically effective amount of an anti-malarial compound to a patient in need thereof to suppress eosinophilia.